

CLAIMS

1. A method for producing a p-type Group III nitride semiconductor wherein the method comprises, during lowering temperature after completion of growth of a Group III nitride semiconductor containing a p-type dopant,

immediately after the completion of the growth, starting, at a temperature at which the growth has been completed, supply of a carrier gas composed of an inert gas and reduction of the flow rate of a nitrogen source; and

stopping supply of the nitrogen source at a time in the course of lowering temperature.

2. A production method according to claim 1, wherein the temperature when the growth has been completed is 900°C or higher.

3. A production method according to claim 1 or 2, wherein the nitrogen source is ammonia gas.

4. A production method according to any one of claims 1 to 3, wherein the carrier gas employed during growth of the semiconductor contains hydrogen gas.

5. A production method according to any one of claims 1 to 4, wherein the flow rate of the nitrogen source after the reduction is 0.001 to 10% with respect to the flow rate of the total volume of gas.

6. A production method according to any one of claims 1 to 5, wherein supply of nitrogen source is stopped at 700 to 950°C.

7. A p-type Group III nitride semiconductor containing hydrogen atom in an amount which is more than 1/5 the p-type dopant concentration and which is less than the p-type dopant concentration.

8. A p-type Group III nitride semiconductor having a resistivity of 20 $\Omega \cdot \text{cm}$ to 10,000 $\Omega \cdot \text{cm}$.

9. A Group III nitride semiconductor light-emitting device comprising a substrate; an n-type layer,

a light-emitting layer, and a p-type layer, the layers being provided atop the substrate and being formed of a Group III nitride semiconductor; a negative electrode provided on the n-type layer; and a positive electrode provided on the p-type layer, wherein the p-type layer is produced through a production method according to any one of claims 1 to 6.

10. A Group III nitride semiconductor light-emitting device comprising a substrate; an n-type layer, a light-emitting layer, and a p-type layer, the layers being provided atop the substrate and being formed of a Group III nitride semiconductor; a negative electrode provided on the n-type layer; and a positive electrode provided on the p-type layer, wherein the p-type layer is composed of a p-type Group III nitride semiconductor according to claim 7 or 8.

11. A light-emitting device according to claim 9 or 10, wherein the positive electrode is formed of a platinum group metal selected from among Pd, Pt, Rh, Os, Ir, and Ru.

12. A light-emitting device according to any one of claims 9 to 11, which is of a flip-chip type.

13. A light-emitting device according to any one of claims 9 to 11, which is of a face-up type.